

38. A Review of the Lizards of the Genus *Tropidophorus* on the Asiatic Mainland. By MALCOLM A. SMITH, M.R.C.S., L.R.C.P., F.Z.S.

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This article concerns those species that are to be found distributed throughout the Indo-Chinese peninsula—Burma, Siam, and French Indo-China—and the region immediately north—Assam, Yunnan, and southern China. Incidentally it completes our knowledge of the whole group, the species of the Indo-Australian region and of the Philippine Islands having been recently undertaken by Nelly de Rooij* and Edward H. Taylor† respectively.

The whole genus now includes some 18 species. It is essentially a highland one, and is largely aquatic in its habits. Its members are to be found in the vicinity of rocky streams, living among the damp herbage on the banks, or hiding under stones and boulders, sometimes almost completely immersed in the water to which they invariably take to avoid capture. They are nocturnal in their habits and are not remarkably agile. One species, *T. microlepis*, I have found to be viviparous.

Different characters have at times been used to group the species, but the one, so far neglected, which appears to me to present the most natural basis for classification, is the manner in which the scales are disposed along the sides of the body. It divides the genus into two broad groups: (1) those with the lateral scales directed straight backwards, with smooth or keeled dorsal scales and smooth or feebly rugose upper head-shields, and (2) those with the lateral scales directed obliquely upwards and backwards, with strongly keeled, often mucronate dorsal scales and with head-shields always rugose.

The preanal shields vary in number, but appear to be constant as regards each species. On the other hand, the number of scales round the body shows considerable individual variation, and unless some other differential character can be shown to exist, does not seem sufficient for specific distinction.

In coloration the species are all much alike.

Within the geographical limits discussed in this paper I recognize the following forms:—

I. Lateral scales directed straight backwards.

a. Head-shields smooth.

| | |
|----------------------------|-----------------------|
| Fronto-nasal entire | <i>T. berdmorei</i> . |
| Fronto-nasal divided | <i>T. laotus</i> . |

b. Head-shields feebly rugose *T. robinsoni*.

* 'Reptiles of the Indo-Australian Archipelago,' 1915.

† 'The Lizards of the Philippine Islands,' 1922.

II. Some or all of the lateral scale-rows directed obliquely.

a. Two preanal shields.

| | |
|---|--------------------------|
| Frontal and fronto-nasal entire, 4th supralabial largest, dorsal scales strongly mucronate | <i>T. assamensis.</i> |
| Frontal and fronto-nasal entire, 4th supralabial largest, dorsal scales not mucronate, median row bicarinate .. | <i>T. hainanus.</i> |
| Frontal and fronto-nasal entire, 5th supralabial largest | <i>T. cocincinensis.</i> |
| Frontal entire, fronto-nasal divided | <i>T. sinicus.</i> |
| Frontal and fronto-nasal divided | <i>P. thai.</i> |

b. Three preanal shields

T. microlepis.

The separation of many of the forms here mentioned is extremely slight, and depends sometimes upon a single scale-character. Most of them have a limited range of distribution, and, so far as I am aware, no two forms have yet been found in the same locality.

1. *TROPIDOPHORUS BERDMOREI*.

Aspris berdmorei Blyth, Journ. Asiat. Soc. Bengal, 1853, xxii. p. 651.

Tropidophorus berdmorei Theob. Journ. Linn. Soc. 1868, p. 24; Anderson, Zool. Res. Yunnan, 1878, p. 796, pl. lxxvi. fig. 3; Bouleng. Cat. Liz. Brit. Mus. 1887, iii. p. 362; Annandale, Rec. Ind. Mus. 1912, viii. p. 59; McM. Smith, Journ. N. H. S. Siam, 1919, iii. p. 225.

Tropidophorus yunnanensis Bouleng. Cat. Liz. Brit. Mus. 1887, iii. p. 362; McM. Smith, Journ. N. H. S. Siam, 1919, iii. p. 224.

Through the kindness of Dr. Annandale, Director of the Indian Museum, I have been able to examine the types—three in number—of this species. The specimens are somewhat faded but are otherwise in excellent preservation. One has 32 scales round the middle of the body, the other two have 34 each. In the two smaller specimens the dorsal scales are distinctly, but not strongly keeled, in the largest one I cannot find any keels at all. Anderson, when comparing these types with his specimens from Yunnan*, states that he found keels on all three, and, except for this difference in the carination of the scales, they agreed entirely. He therefore labelled the Yunnan specimens *berdmorei*. This view should certainly be maintained, and *T. yunnanensis*, founded later evidently on a misunderstanding, became a synonym of it.

My own collections of this lizard from Siam, supplemented by an excellent series from Burma in the Indian Museum, have enabled me to examine a large number of specimens. In the number of scales round the body, and in the degree of carination

* The Yunnan specimens are now lost. Dr. Annandale tells me he has never been able to discover what happened to the types of Anderson's reptiles and batrachians. Many of them never seem to have been incorporated in the Museum collection.

of the dorsal shields, they show considerable variation, but I cannot find any satisfactory combination upon which they can be racially separated. Some have the scales smooth, some have them faintly keeled, others more strongly. Each locality has its own slight variation. Where one adult has smooth scales, all the other adults from that place have the same, and *vice versa*.

All the Burmese examples have two loreal shields, one behind the other. Most of the Siamese individuals have three, the anterior one being divided horizontally. The præfrontal shields may be in contact, or separated, or have a small shield interposed between them, irrespective of locality.

The following table shows the variation in the specimens I have examined:—

| BURMA. | | SIAM. | |
|------------------------------------|---------|-----------------------------|---------|
| Locality. | Scales. | Locality. | Scales. |
| Mergui | 32-34 | S. of Utaradit. | 32-36 |
| Tenasserim | 36-40 | Doi Nga Chang, N. Siam. | 36-38 |
| Takoo Mts., Central Tenasserim. | 36-38 | Me Wang forest, N. Siam. | 32-36 |
| Pegu..... | 40 | ... | ... |
| Bia Po, Karin Hills ... | 34 | ... | ... |
| Bhamo | 32 | ... | ... |

The allied Bornean *T. beccarii* (Peters) appears to have a variation similar to that of *T. berdmorei*, and *T. moquardi* Boulenger should, in my opinion, be united with it. The specimens in the British Museum show the range in scale-rows to be from 28-36 round the body; apart from this I can find no character upon which they can be separated.

2. TROPIDOPHORUS LAOTUS, sp. n.

Types. Adults ♂ and ♀, author's Nos. 5410 and 5414, collected at Muang Liep, N. of Pak Lai, Upper Mekong, French Laos, in January 1920. Presented to the British Museum (Natural History).

Description of the types.—Upper head-shields smooth; a pair of fronto-nasals, each one longer than broad: præfrontals separated by a small azygos shield; frontal as long as the parietal and fronto-parietal together; parietals in suture behind the interparietals; 4 supraoculars, 1st largest, 1st and 2nd in contact with the frontal, 4th entering the supraciliary border; nostril in a single shield; two superposed anterior loreals, succeeded by a larger posterior one; 6 supralabials, 4th largest and forming subocular; 5 infralabials, the first longest and in contact with the postmental and first chin-shield; temporals small and like the body-scales, except the superior, which is much larger; a single postmental succeeded by two pairs of large shields. Tympanum as large as the eye-opening.

Thirty-three scales round the middle of the body in the ♂, 34 in the ♀, all quite smooth; ventrals largest, laterals smallest and directed straight backwards; a pair of enlarged preanals; a series of enlarged scales beneath the tail. The hind-limb reaches the wrist in the ♂, and not quite so far in the ♀; subdigital lamellae smooth, 18 to 20 beneath the 4th toes.

Dark brown above, with lighter black-edged V-shaped bars; sides of body with small white spots; below whitish, throat and tail thickly spotted with black.

Variation.—The azygos shield separating the præfrontals varies in size, and may be absent, when either the præfrontals are in contact or the frontal touches the fronto-nasal. 32 scales round the body occurs in nearly half the series. In one example (No. 5416) there are only 30 scales. In the young the dorsal scales are faintly keeled, and the limbs are proportionately longer, the leg reaching the wrist or the elbow of the adpressed fore-limb.

T. laotus is identical with the smooth-scaled form of *T. berdmorei* except for the divided fronto-nasal. Two examples (Nos. 5412 and 5425 from Muang Liep and Nong Kai respectively) have the fronto-nasal single as in true *berdmorei*; but with so large a series at hand I prefer to regard them as aberrant examples of *T. laotus*.

Sixty-eight specimens examined, from Muang Liep, Nong Kai, Pak Maat, Pak Men, and Hoi King, all localities on the Mekong river, to the north and south of, and within 80 kilometres of, Pak Tai.

Adult males can be recognized from females by the broader head at the angle of the jaw. Most of the old males also have the head-shields considerably scratched and scarred, and I gather from this that a considerable amount of fighting amongst themselves takes place.

Measurements of specimens of T. laotus in mm.

| Author's No. ... | 5410 | 5414 | 5411 | 5415 | 5440 | 5417 | 5421 |
|----------------------|------|------|------|------|------|------|------|
| Head and body | 71 | 71 | 74 | 75 | 75 | 51 | 40 |
| Tail | 95 | 105 | 100 | 96 | 105 | 82 | 62 |
| Length of head | 18 | 17 | 17 | 17 | 19 | 13 | 11.5 |
| Width of head | 12 | 10 | 11 | 11 | 12 | 8 | 6.5 |
| Fore-limb | 20 | 19 | 20 | 20 | 21 | 14 | 12 |
| Hind-limb | 30 | 27 | 28 | 30 | 31 | 21 | 18 |
| Sex | ♂ | ♀ | ♀ | ♀ | ♂ | juv. | juv. |
| No. of scales | 33 | 34 | 34 | 34 | 32 | 32 | 32 |

3. TROPIDOPHORUS ROBINSONI.

Tropidophorus robinsoni Mlcm. Smith, Journ. N. H. S. Siam, 1919, iii. p. 223.

Besides the large series from the type-locality there are six specimens from Tavoy, Tenasserim, in the Indian Museum (Nos. 12722-12727). They agree with the types in every respect.

4. *TROPIDOPHORUS ASSAMENSIS*.

Tropidophorus assamensis Annandale, Rec. Ind. Mus. 1912, viii. p. 58.

Still known only from the type-specimen, which I have examined. From *T. cocincinensis* it differs in having the 4th supralabial largest and below the middle of the eye, in having no small shields interposed between the loreals and supralabials, and in the strongly mucronate dorsal scales. It has one large anterior and one posterior loreal scale. The ventral keeling is probably an immature character as the specimen is not yet fully grown.

5. *TROPIDOPHORUS HAINANUS*, sp. n.

Type. Author's number 6997, collected at Ang Mao, alt. 600 m., near the Five Finger mountain, island of Hainan, in January 1923. Presented to the British Museum (Natural History).

Description of the type.—Upper head-shields strongly striated; fronto-nasal single, as long as broad, in contact with the frontal; frontal once and two-thirds longer than broad, as long as the fronto-parietal and interparietal together; parietals in contact behind the interparietal; 4 supraoculars, the anterior two touching the frontal, the fourth just entering the supraciliary border; 5 supraciliary shields anterior to the fourth supraocular; nostril in a single shield; two anterior and two posterior loreal shields; temporals small, with strong striæ like the upper head-shields; 6 supralabials, the fourth largest and below the middle of the eye; 5 infralabials, the first in contact with the azygos postmental and anterior chin-shield. Tympanum as large as the eye-opening.

Thirty-two scales round the middle of the body; dorsals and laterals strongly keeled, not mucronate, most of the scales in the median dorsal row with two keels, or where unicarinate smaller than the others; laterals smaller than the dorsals, the upper rows with a feeble obliquity upwards and backwards; ventrals larger than the dorsals, quite smooth; gulars feebly keeled; a pair of enlarged præanals; three rows of smooth scales below the tail, the median row transversely enlarged. The hind-limb reaches the wrist.

Dark reddish brown above, with indistinct light dark-edged cross bars, the anterior two V-shaped; flanks with large whitish dark-edged blotches; belly white speckled black; throat with white longitudinal streaks.

Variation.—Six specimens examined from the type-locality (Nos. 6996 to 7001), and one (No. 7002) from the foot of the Five Finger mountain about 20 miles distant.

The præfrontals are separated in every example; there are seven supralabials in No. 7002, the 5th being below the middle of the eye; one specimen has only 30 scales round the body, another has 34; in some examples only a few scales of the

median dorsal row are bicarinate; in two juveniles the ventral scales are feebly keeled; the hind-limb may reach the elbow. Two examples are light brown in colour, with the usual markings.

Although Hainan is not the mainland of Asia, the fauna of the island is so closely related to that of Indo-China, that this species should be included here.

Measurements of specimens in mm.

| | | |
|------------------------------|------|------|
| No. | 6997 | 7001 |
| Length of head and body..... | 47 | 49 |
| Tail | 60 | 55 |
| Fore-limb | 13 | 12 |
| Hind-limb | 20 | 18 |

6. *TROPIDOPHORUS COCINCINENSIS*.

Tropidophorus cocincinensis Dum. & Bib. 1839, v. p. 556, pl. lvii. fig. 1.

Tropidophorus cochinchinensis Bouleng. Cat. Liz. Brit. Mus. 1887, iii. p. 363 (in part).

The types, three in number, two adults and one juvenile, are in the Paris Museum. M. Angel has kindly examined them for me, and has given me the following particulars.

They have 30 and 32 scales round the body, the laterals a little smaller than the others. Dorsal, lateral, ventral, and gular scales keeled in the young example, the ventral and gular smooth in the adults. Two large præanal plates. Tail longer than the head and body. Caudal scales strongly keeled except for the three median lower rows. The fifth supralabial is largest and below the middle of the eye, and there are small scales interposed between the supralabials and the loreals.

The exact type-locality of *T. cocincinensis* is unknown; it is said to have come from Cochin-China, but in view of the known range of *T. microlepis* it seems probable that it came from farther north.

7. *TROPIDOPHORUS SINICUS*.

Tropidophorus sinicus Boettger, Zool. Anz. 1886, p. 519; Bouleng. Cat. Liz. Brit. Mus. 1887, iii. p. 362; A. Mell, Archiv für Naturgesch. 1922, 10 Heft, p. 114.

The type-locality is near Canton, and it has also been found in the Mai Son Mts., Tonkin.

I recently obtained two half-grown specimens on the Peak in Hongkong. They have 30 scales each round the middle of the body, the laterals and dorsals strongly keeled and feebly mucronate, the ventrals feebly keeled; loreals 1+1; 5 infra-labials, the first long and in contact with the divided post-mental and first chin-shield. Belly in life salmon-pink.

8. TROPIDOPHORUS THAI.

Tropidophorus thai Mlcm. Smith, Journ. N. H. S. Siam, 1919, iii. p. 226.

Habitat. N. Siam. Still known only from the original specimens.

9. TROPIDOPHORUS MICROLEPIS.

Tropidophorus microlepis Günther, P. Z. S. 1861, p. 188; id. Rept. Brit. Ind. 1864, p. 76, pl. x. fig. A.

Tropidophorus cochinchinensis (in part) Bouleng. Cat. Liz. Brit. Mus. 1887, iii. p. 363; Mlcm. Smith, Journ. N. H. S. Siam. 1919, iii. p. 227.

As already stated, the præanal shields appear to be constant in number as regards each species, and in 19 examples of *T. microlepis* from the type-locality I find 3 præanal shields in every instance. Another specimen from Dran, on the Langbian plateau, S. Annam, has also 3 præanal shields, and agrees in all other respects with the topotypes.

With so important a character to guide one it is justifiable to maintain Günther's species, and to keep it distinct from *cocincinensis*, the three type-specimens of which have only two præanal shields each.

In *T. microlepis* the dorsal and lateral scales are all strongly keeled and spinously produced, all of the lateral rows, except the lowest, being obliquely directed. The first lower labial is very small, allowing the second labial to make broad contact with the post-mental.